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THE IDENTITY OF THE GORDIACEAN SPECIES, CHORDODES MORGANI AND C. PUERILIS.

BY THOMAS H. MONTGOMERY, JR., PH.D.

In a preceding contribution[1] I described as new and distinct species *Chordodes morgani* and *C. puerilis*, the former based on two females, the latter on two males. The differences in the sculpturation of the surface of the cuticle seemed then to justify the separation of these two species. In a later paper[2] I stated that "*Chordodes puerilis* and *C. morgani* may eventually be found to be the two sexes of the same species;" and the truth of this supposition is now confirmed. *C. puerilis* thus becomes a synonym of *C. morgani*, since the latter was first described in the original paper.

Material consisting of seven females and five males, all collected together at the same time (July 27, 1899), on the shore of South Bass Island, in the western end of Lake Erie, in the explorations of the Great Lakes conducted by the U. S. Fish Commission, were very kindly sent to me for identification by Prof. Jacob E. Reighard; and I am indebted to him and to Mr. George M. Bowers, Fish Commissioner, for permission to publish my conclusions. An examination on cross sections of the cuticle of a number of these specimens shows very considerable variation, but variation with intergradation; and shows also that there is more or less of a sexual difference in the form of the papillæ of the cuticle. In each individual the cuticle of the middle region of the body was examined.

In the following description the original specimens, as well as the new material, shall be described together. In my first paper the form of the body was described, and there is nothing new to be added to that account.

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[1] "The Gordiacea of Certain American Collections, with Particular Reference to the North American Fauna," *Bull. Mus. Comp. Zool.*, Harvard College, Vol. 32, No. 3, 1898.

[2] "Synopses of North American Invertebrates. II, Gordiacea (Hair Worms)," *American Naturalist*, Vol. 33, No. 392, 1899.

Size and Color.—The largest female (the type of *C. morgani*) measures 222 mm. in length, the largest male 220 mm., the smallest individual seen (male, co-type of *C. puerilis*) 64 mm. The color varies from a dull chocolate brown to a light buff brown, averaging darker in the males; the head end is always white.

Cuticle.—Cross sections of the cuticle examined with high powers show the following kinds of prominences:

1. Low papillæ of irregular outline, rarely higher than broad, which bear no spines. These are shown in Plate XI, figs. 1–3, 9. In general they are, next to the following kind, the most numerous, and are generally the smallest.

2. The most numerous are small papillæ, rounded or more frequently conical on outline, each of which bears a delicate, stiff spine of nearly its own height. These are shown in Plate XI, figs. 1–3, 5–11. Generally they are rather evenly distributed between the larger papillæ, but in one female (fig. 7) considerable portions of the cuticle show them arranged in close patches, without papillæ in the spaces intervening. In none of the males was such an arrangement found.

3. Large papillæ, considerably higher and broader than the preceding, shown in Plate XI, figs. 1, 3, 5, 6, 10, 11. In the smallest female (length 125 mm.) these were entirely absent. Their crowns are generally flattened or rounded, and bear each a circlet of short, stiff, delicate spines, few and variable in number; in the largest female, the type of *C. morgani*, fig. 11, most of the papillæ were not provided with such spines. Sometimes, not frequently, the bases of these papillæ are tuberculated or dentated. In the males these large papillæ are generally higher than broad, except in the smallest male (fig. 1, co-type of *C. puerilis*), where they are about as broad as high. In the females they are relatively less numerous than in the males, and relatively broader and shorter, more rectangular in outline and with their summits more regularly flattened. Fig. 11 shows their appearance in the largest female, which may be compared with the appearances in the largest males (Plate XI, figs. 3, 5, 6).

4. Small rounded papillæ, each of which bears on its summit a long, hyaline, finger-shaped process (Plate XI, figs. 1, 3, 8, 11). These are present in all the individuals, but very much less numerous than any of the preceding kinds, generally occurring at

considerable distances apart. Such processes are found in most species of the genus.

5. Papillæ, each of which bears a thick, more or less curved, conical spine, refractive and homogeneous in appearance (Plate XI, figs. 2, 4, 11). These are the least numerous. I did not find them in the specimens from Lake Erie, but they are present in the types and co-types of *morgani* and *puerilis* (I had overlooked them at the time of my former description). The size and form of the spines is variable.

Surface views of the cuticle were given in my preceding paper. In the males the large papillæ (the third kind) always appear darker and larger than the other papillæ; they may be arranged close together or, when less numerous, show the tendency to form large, irregular groups. In the largest females the cuticle on surface view is like that of the males, except that the third kind of papillæ are less numerous; in females which lack the third kind of papillæ, the darker disks on the surface of the cuticle represent patches of papillæ of the second kind.

Diagnostic Characters.—The sculpturation of the cuticle is so variable that it is difficult to give a sharp diagnosis. But the regular occurrence of papillæ (the second kind) of more or less conical form, each bearing a short delicate spine; the quite general occurrence of higher papillæ (the third kind), each generally with a circlet of a few similar spines, and the occasional occurrence of papillæ bearing each a thick conical spine, seem to distinguish *C. morgani* from any hithero described species of the genus. But the degree of variation in this form, individual and sexual, shows how necessary it is to examine large series of individuals in separating the species of the *Gordiacea;* an individual variation about as great is found in *C. occidentalis* Montg., as has been shown by me in a preceding paper.[3]

All the specimens seen by me of *Chordodes morgani* were from the United States of America, from the following localities: Lake Erie, Maryland, Iowa and Pennsylvania; thus it would seem to be a species of the eastern portion of North America.

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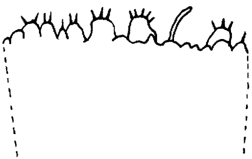
[3] *Proc. California Acad. Sciences,* Third Series, Vol. I, No. 9, 1898.

EXPLANATION OF PLATE XI.

All the figures represent portions of transverse sections of the cuticle, except fig. 4, which represents a single papilla; all were drawn with the camera lucida at the height of the microscope stage with a Zeiss microscope, length of tube 100 mm., ocular 4, homogeneous immersion objective $\frac{1}{12}$th.

Figs. 1, 2.—Male (co-type of *C. puerilis*, length 64 mm.).
Figs. 3, 4.—Male (type of *C. puerilis*, length 228 mm.).
Fig. 5.—Male (length 150 mm.).
Fig. 6.—Male (length 220 mm.).
Fig. 7.—Female (length 127 mm.).
Figs. 8, 9.—Female (length 190 mm.).
Fig. 10.—Female (length 180 mm.).
Fig. 11.—Female (type of *C. morgani*, length 220 mm.).



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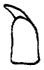

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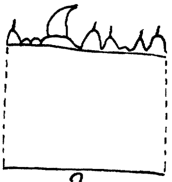

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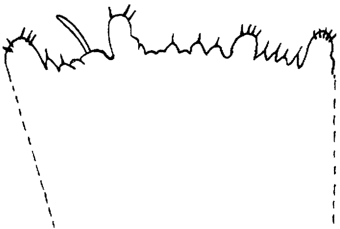

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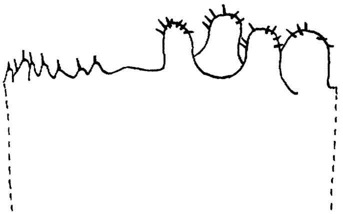

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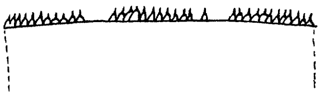

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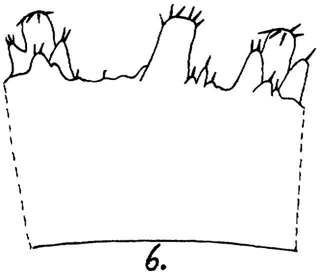

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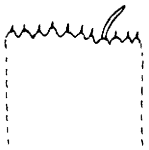

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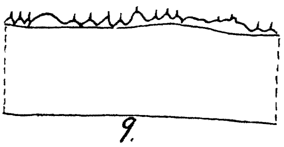

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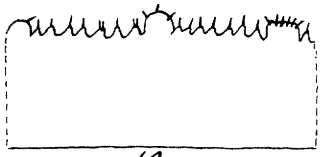

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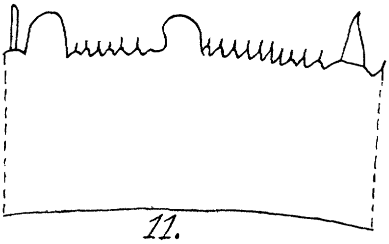

11.

MONTGOMERY ON CHORDODES MORGANI AND C. PUERILIS.